

WHAT IS CLAIMED:

1. A vehicle safety device comprising:

a first seat mounted within a passenger compartment of the vehicle, the first seat being movably connected to frame of the vehicle by a first seat position adjusting mechanism, the first seat position adjusting mechanism allowing the first seat to move along a first axis between a forward-most position and a rearward-most position; and

a first air-bag mounted within the passenger compartment in front of the forward-most position of the first seat,

the forward-most position being defined as a position of the first seat in which a distance between a passenger seated in the first seat and the first air-bag is equal to a minimum safe clearance.

2. The vehicle safety device according to claim 1, wherein the first seat is a driver's seat and wherein the vehicle includes at least one vehicle control pedal positioned in the passenger compartment forward of the first seat, the vehicle safety device further comprising a pedal position adjusting mechanism for moving the at least one pedal toward and away from the first seat.

3. The vehicle safety device according to claim 2, wherein the pedal position adjusting mechanism includes a pedal mounting member to which the at least one pedal is rotatably mounted, the pedal mounting member being slidably

mounted within the passenger compartment so that the at least one pedal may be slid along a pedal adjusting axis substantially parallel to the first axis between a forward-most position and a rearward-most position.

4. The vehicle safety device according to claim 2, wherein, when in the forward-most position, a seat-back of the first seat is separated from the first air-bag by a distance equal to the minimum safe clearance plus a value corresponding to an adult chest depth.

5. The vehicle safety device according to claim 2, further comprising a distance sensor which detects a distance between a passenger seated in the first seat and the first air-bag, the forward-most position being defined based on the distance detected by the distance sensor.

6. The vehicle safety device according to claim 2, further comprising:

a second seat mounted within the passenger compartment, the second seat being movably connected to the vehicle frame by a second seat position adjusting mechanism, the second seat position adjusting mechanism allowing the second seat to move along a second axis parallel to the first axis between a forward-most position and a rearward-most position; and

a second air-bag mounted within the passenger compartment in front of the forward-most position of the second seat,

the forward-most position of the second seat being defined as

a position of the second seat in which a distance between a passenger seated in the second seat and the second air-bag is equal to a minimum safe clearance.

7. The vehicle safety device according to claim 1, wherein the first seat is a driver's seat and the first air-bag is mounted in a steering wheel of the vehicle and wherein the vehicle includes at least one vehicle control pedal movably coupled to a pedal mount, the pedal mount being movably mounted to the vehicle so that the at least one pedal may be moved toward and away from the first seat.

8. The vehicle safety device according to claim 7, further comprising a cable extending from a first end coupled to an actuator of a vehicle control device, around first and second pulleys to a second end thereof, the second end of the cable being coupled to an anchor member, the first pulley being rotatably and movably coupled to the pedal mount and the second pulley being rotatably and non-movably coupled to the pedal mount.

9. The vehicle safety device according to claim 8, further comprising an abutment member coupled to the at least one pedal and abutting the first pulley so that, upon actuation of the pedal, the first pulley moves relative to the pedal mount applying a corresponding force to the cable to operate the actuator of the vehicle control device.

10. The vehicle safety device according to claim 1, wherein the first seat position adjusting mechanism includes a first motor and a seat position switch coupled to the first motor so that actuation of the seat position switch causes a corresponding motion of the first seat.

11. The vehicle safety device according to claim 10, further comprising:

a computer coupled between the first motor and the seat position switch; and

a distance sensor which detects a distance between a passenger seated in the first seat and the first air-bag, the distance sensor being coupled to the computer;

wherein the computer determines the location of the forward-most position of the first seat so that, when the first seat is in the forward-most position, a distance between a passenger seated in the first seat and the first air-bag is equal to the minimum safe clearance and wherein the computer prevents further operation of the first motor in a forward direction when the first seat reaches the forward-most position.

12. The vehicle safety device according to claim 11, further comprising a pedal mount to which at least one vehicle control pedal is mounted and a second motor coupled to the pedal mount wherein, when the first seat is in the forward-most position, upon actuation of the seat position switch to request forward motion of the first seat the computer operates the second motor to move the pedal mount toward the first seat.

13. The vehicle safety device according to claim 11, further comprising a pedal switch, operation of the pedal switch causing a corresponding motion of the pedal mount.

14. The vehicle safety device according to claim 12, further comprising a memory in which preferred first seat and pedal mount positions are stored.

15. The vehicle safety device according to claim 11, further comprising a third motor coupled to the first seat to move the first seat vertically.

16. The vehicle safety device according to claim 15, further comprising a height sensor for sensing a height of eyes of a passenger in the first seat, wherein the height sensor is coupled to the computer and wherein the computer controls the third motor to move the first seat vertically until an optimum eye height is achieved.

17. The vehicle safety device according to claim 1, wherein the seat position adjusting mechanism includes a lever which, in a first position, prevents the first seat from moving forward and rearward and which, in a second position, releases the first seat so that the first seat may be moved forward and rearward by a passenger seated in the first seat.

18. The vehicle safety device according to claim 11, wherein, when the distance sensor indicates that a passenger seated in the first seat has encroached within the minimum safe distance, the computer controls operation of the first air-bag in a reduced clearance mode.

19. The vehicle safety device according to claim 18, wherein in the reduced clearance mode, the computer prohibits deployment of the first air-bag.

20. The vehicle safety device according to claim 18,

wherein in the reduced clearance mode, the computer reduces an inflation pressure of the first air-bag.

21. The vehicle safety device according to claim 18, wherein in the reduced clearance mode, the computer directs staged inflation of the air-bag.

22. The vehicle safety device according to claim 1, further comprising:

first and second geared members movably mounted within the pedal mount;

a geared wheel non-rotatably coupled to the at least one pedal, the geared wheel being received between the first and second geared members so that rotation of the geared wheel causes a corresponding motion of one of the first and second geared members; and

one of a push rod and a pull cable coupled between the first geared member and an actuator of a vehicle control device corresponding to the at least one pedal.

23. The vehicle safety device according to claim 2, wherein a plurality of pedals are coupled to the pedal position adjusting mechanism so that, when the position of the pedals is adjusted a predetermined positioning of the pedals relative to one another is maintained.

24. The vehicle safety device according to claim 1, further comprising a motor coupled to the first seat to move the first seat vertically.

25. The vehicle safety device according to claim 24, further comprising:

a height sensor for sensing a height of eyes of a passenger in the first seat; and

a seat position controller that controls the motor to move the first seat vertically until an optimum eye height is achieved.

26. The vehicle safety device according to claim 1, further comprising a height sensor for sensing a position of a portion of a passenger seated in the first seat corresponding to a height of the eyes of the passenger.

27. The vehicle safety device according to claim 26, further comprising a vertical motion motor which operates based on data from the height sensor, to adjust a height of the first seat to attain an optimum eye height of a passenger seated in the first seat.

28. The vehicle safety device according to claim 1, further comprising a distance sensor sensing a position of a passenger seated in the first seat corresponding to a distance between the passenger and the first air-bag.

29. The vehicle safety device according to claim 28, further comprising a horizontal motion motor which operates based on data from the distance sensor, to move the first seat along the first axis until the distance sensor indicates that the first seat is in the forward-most position.

30. The vehicle safety device according to claim 12,

further comprising an override switch which allows a passenger to select a personal forward-most position so that, when the first seat is in the personal forward-most position, actuation of the seat position switch to request further forward motion of the first seat initiates rearward motion of the pedals.

31. The vehicle safety device according to claim 5, further including a passenger notification device coupled to the distance sensor wherein, when a passenger moves forward within the minimum safe clearance, the notification device notifies the passenger that the minimum safe clearance has been encroached upon.

32. A method of maintaining a minimum safe clearance between an air-bag mounted in a vehicle and a vehicle passenger to be protected by the air-bag, wherein the vehicle includes a seat which may be moved toward and away from the air-bag, the method comprising the steps of:

limiting motion of a seat toward the air bag to prevent motion of the seat beyond a forward-most position wherein, when in the forward-most position, a passenger seated in the seat is separated from the air-bag by a predetermined minimum safe clearance; and

adjusting a position of at least one vehicle control pedal to achieve a desired distance between the seat and the at least one pedal.

33. The method according to claim 32, wherein the vehicle includes a computer, a sensor for detecting a distance between a passenger seated in the seat and the air-bag and a seat motor for moving the seat toward and away from the air-

bag, wherein the step of limiting motion of the seat is performed by the computer which prohibits further forward directed action of the seat motor when the sensor indicates that the distance between a passenger seated in the seat and the air-bag is equal to the minimum safe clearance.

34. The method according to claim 33, wherein the vehicle further includes a pedal motor for moving the at least one pedal toward and away from the seat, the method further comprising the step of:

operating the pedal motor to move the pedals rearward toward the seat while the seat is in the forward-most position.

35. The method according to claim 33, further comprising the step of:

preventing the air-bag from deploying when the sensor indicates that a passenger seated in the seat has encroached within the minimum safe clearance.

36. The method according to claim 33, further comprising the step of:

reducing an inflation rate of the air-bag when the sensor indicates that a passenger seated in the seat has encroached within the minimum safe clearance.

37. The method according to claim 33, further comprising the step of:

inflating the air-bag in stages when the sensor

indicates that a passenger seated in the seat has encroached within the minimum safe clearance.

38. The method according to claim 33, wherein the vehicle includes crash detecting means for determining whether a crash has occurred, the method further comprising the step of:

configuring the vehicle in a post-crash mode in response to input from the crash detecting means, the post-crash mode including performance of at least one of the following sub-steps:

shutting down a vehicle engine;

unlocking doors of the vehicle;

lowering vehicle windows; and

operating vehicle communication devices to request assistance.